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Contemporary Alcohol Use Patterns among a National Sample of U.S. Adult Drinkers

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Abstract

Aims—To identify subgroups of adult drinkers characterized by typical drinking patterns.

Methods—We used data from the National Epidemiologic Survey on Alcohol and Related Conditions-III to classify drinkers based on several indicators of drinking. Past-year drinkers aged 18–64 were included ($n = 22,776$).

Results—Latent class analysis revealed a 5-class model: Occasional, Light Drinkers (28%), Frequent Drinkers (25%), Infrequent Drinkers with Occasional Binging (5%), Frequent Drinkers with Occasional Binging (22%), and High-Intensity Drinkers (20%).

Discussion—Although most were light drinkers, many engaged in excessive drinking. Given the potential risk for harm, prevention efforts are warranted particularly for High-Intensity Drinkers.

Keywords

Drinking patterns; heavy episodic drinking; high-intensity drinking; intoxication; latent class analysis

Excessive alcohol use is associated with many short- and long-term health risks.¹ Hazardous drinking behavior cost the U.S. government approximately \$101 billion in 2010.² Given these physical, emotional, and monetary costs, the National Institute of Alcohol Abuse and Alcoholism (NIAAA) has outlined drinking guidelines to aid U.S. adults in protecting

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themselves from alcohol-related harms. Many drinkers, however, exceed these guidelines and may be at risk for negative consequences. To better inform prevention and intervention efforts, we must first understand the variety of alcohol use patterns among U.S. adult drinkers. One approach is to identify subgroups of drinkers most at risk by examining multiple indicators of alcohol use behaviors, rather than individual metrics of consumption. In particular, person-centered techniques, such as latent class analysis (LCA^{3, 4}) can group individuals based on their responses, such as substance use indicators. Such methods would allow investigations of the heterogeneity of adult drinking behavior. Prior work has successfully used LCA to identify subgroups of substance users across various populations, such as adolescents⁵, college students⁶, and adults receiving treatment for substance dependence⁷. The current study used LCA to (1) identify subgroups of adult drinkers characterized by typical drinking patterns, and (2) examine differences within subgroups on demographic variables and prevalence of psychiatric disorders.

Methods

The current study used limited access data from the National Epidemiologic Survey on Alcohol and Related Conditions-III (NESARC-III) collected in 2012–2013.⁸ NESARC-III randomly selected U.S. adults who were aged 18 years or older. Hispanic, Black, and Asian adults were oversampled for more reliable estimates; thus, sampling weights were incorporated in all analyses. The survey protocol was approved by the institutional review boards of the National Institutes of Health and Westat. Those aged 18 to 64 years and who reported past-year alcohol use ($n = 22,776$) were included in the analytic sample. Of all adults aged 18 to 64 years, approximately 90% reported lifetime drinking and 76% reported past-year drinking. Most participants were White (71%) and women (54%). Information on accessing NESARC-III data can be found at <https://www.niaaa.nih.gov/research/nesarc-iii/nesarc-iii-data-access>.

Five indicators of past 12-month alcohol consumption were used to identify latent classes of adult drinkers: drinking frequency, average daily quantity, heavy episodic drinking (HED), high-intensity drinking, and intoxication frequency. Response options are listed in Table 1. Past 12-month DSM-5 generalized anxiety disorder and major depressive disorder also were assessed with response options including 0 (*did not meet criteria*) and 1 (*met criteria*). Models were estimated using PROC LCA in SAS¹¹ and the BCH approach¹² to examine differences within subgroups.

Results

Latent class analysis was used to identify subgroups of individuals based on the alcohol use indicators mentioned above. The large sample size enabled a thorough validation of our model selection. We randomly divided the large sample into 10 subsets. Within each, models with 1–8 classes were compared based on the values of information criteria (Akaike Information Criterion [AIC] and Bayesian Information Criterion [BIC]). The BIC and AIC were used to help set our minimum and maximum number of classes, respectively.¹³ In each of the 10 subsamples, the fit criteria suggested models with 4 to 7 classes. For example, within one subset, the AIC for solutions with 4 through 8 classes was as follows: 171 (4-

class), 142 (5-class), 132 (6-class), 124 (7-class), and 130 (8-class); BIC was as follows: 349 (4-class), 366 (5-class), 401 (6-class), 439 (7-class), and 491 (8-class). Here, the AIC suggests a 7-class model as optimal and the BIC a 4-class model. We selected a 5-class model based on interpretability and distinction of classes. We obtained final parameter estimates using the full sample.

Characteristics of each of the five classes are shown in Table 2. Occasional, Light Drinkers represented the largest subgroup (28%) and were characterized by infrequent (i.e., less than monthly) drinking and light drinking episodes. Frequent Drinkers (25%) drank monthly with a fairly even divide between those who did and did not engage in moderate drinking. Infrequent Drinkers with Occasional Binging represented the smallest class (5%), comprised of those who engaged in infrequent drinking yet occasional (i.e., past-year but less than monthly) HED. Frequent Drinkers with Occasional Binging (22%) primarily engaged in past-year but not monthly HED, though many (36%) within this class engaged in HED at least monthly. Finally, High-Intensity Drinkers (20%) engaged in frequent HED and had a high probability (0.72) of engaging in past-year high-intensity drinking, with the majority reporting frequent intoxication.

We then examined differences across demographic and psychiatric disorder prevalence rates across latent classes (see Table 2). The distributions of gender, race/ethnicity, age, full-time employment, marital status, and college education within each class were generally similar to the population prevalences, with some exceptions. Women were overrepresented in the Frequent Drinkers class and men were overrepresented in the High-Intensity Drinkers class. Black adults were underrepresented in the Infrequent Drinkers with Occasional Binging class. Those over the age of 45 were overrepresented in the Occasional, Light Drinkers class and young adults (aged 18 – 29) were highly prevalent in the High-Intensity Drinkers class. Mean age of each class was as follows: Occasional, Light Drinkers was 45.64 ($SE\bar{x} = 0.28$) years; Frequent Drinkers was 40.13 ($SE\bar{x} = 0.32$) years; Infrequent Drinkers with Occasional Binging were 34.75 ($SE\bar{x} = 0.51$) years; Frequent Drinkers with Occasional Binging was 39.56 ($SE\bar{x} = 0.27$) years; High-Intensity Drinkers was 34.09 ($SE\bar{x} = 0.26$). Full-time employees were underrepresented in the Infrequent Drinkers with Occasional Binging class and overrepresented in the Frequent Drinkers with Occasional Binging class. Married individuals were overrepresented in the Occasional, Light Drinkers class and underrepresented in the High-Intensity Drinkers class. Individuals who had completed at least some college were underrepresented in the Infrequent Drinkers with Occasional Binging and High-Intensity Drinkers classes, and were overrepresented in the Frequent Drinkers with Occasional Binging class. With regard to DSM-5 criteria, both psychiatric disorders (major depressive disorder, generalized anxiety disorder) were most prevalent in the Infrequent Drinkers with Occasional Binging and High-Intensity Drinkers classes. Latent classes differed significantly based on all demographic variables and most pairwise comparisons were significant, given the large sample size, with the exception of a few. For example, all classes differed from each other on sex except Frequent Drinkers and Infrequent Drinkers with Occasional Binging.

Discussion

Our findings revealed that although the largest alcohol use classes consisted of primarily infrequent and frequent light drinkers, many adults exceeded daily drinking guidelines and engaged in occasional or frequent HED. Perhaps the most notable finding was that a sizable percentage (20%) of adult drinkers belonged to a subgroup reporting consumption of twice the limit of HED in a single drinking occasion. Such high-intensity drinking is linked with more frequent HED than those who engage in HED only.¹⁴ In addition, within the two riskiest classes of drinkers, there appeared to be a discrepancy between frequency of intoxication and frequency of HED: among the High-Intensity Drinkers, 99% indicated monthly HED and only 56% reported monthly intoxication. Excessive drinking without feeling intoxicated may reflect high alcohol tolerance in this class of drinkers. Importantly, the High-Intensity Drinkers class was most common among young adults. Although many young adults “mature out” of heavy drinking, some, particularly those who do not attend college, continue or increase their excessive drinking habits into adulthood.¹⁵ A greater focus is needed on studying changes in drinking patterns during this developmental period.

A limitation is that our measures of alcohol consumption are based on self-report. Participants may have under-reported their drinking behavior for social desirability reasons. Additionally, the data are cross-sectional with a wide age range, thus some comparisons made (e.g., marital status) may be age-sensitive. Future work may benefit from building from these findings by examining developmental changes across age. For example, given that certain classes are small (i.e., the Infrequent Drinkers with Occasional Binging class represented 5% of all drinkers), this subgroup may represent a transitional rather than stable class of individuals.

This study identified five unique classes of drinkers based on a current, nationally representative sample of U.S. adults. Although many reported exceeding recommended daily limits, the subgroup that may warrant the most attention is the High-Intensity Drinkers class. Given the potential risk for harms and that young adults represented the largest age group within this class, prevention and secondary intervention efforts are needed for this at-risk group.

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Table 1**Past-Year Alcohol Use Indicators for Latent Class Model of Adult Drinkers**

Variable	Response Options
Drinking Frequency	0 = Drank an alcoholic beverage less than once a month in the past year 1 = Drank at least once a month
Average Daily Quantity ⁹	0 = Engaged in moderate drinking on average during past year (i.e., consumed fewer than 2/3 drinks per drinking day on average for women/men) 1 = Exceeded moderate drinking guidelines
HED ¹⁰	0 = Did not engage in HED during past year (i.e., consumed fewer than 4/5 drinks in one occasion for women/men) 1 = Engaged in HED at least once in the past year, but less often than once a month 2 = Engaged in HED at least once a month
High-Intensity Drinking	0 = During the heaviest drinking occasion in the past year, consumed fewer than 8/10 drinks during one occasion for women/men 1 = Consumed 8/10 drinks in one occasion for women/men at least once in the past year
Intoxication Frequency	0 = Did not report drinking enough to feel intoxicated in the past year 1 = Reported intoxication at least once in the past year, but less than once a month 2 = Reported drinking enough to feel intoxicated at least once a month

Notes. HED = heavy episodic drinking.

Table 2

Characteristics of Five Alcohol Use Behavior Classes, with Demographic Characteristics and Psychiatric Disorder Rates for Each Latent Class

	Class 1: Occasional, Light Drinkers (28%)	Class 2: Frequent Drinkers (25%)	Class 3: Infrequent Drinkers with Occasional Binging (5%)	Class 4: Frequent Drinkers with Occasional Binging (22%)	Class 5: High-Intensity Drinkers (20%)
<i>Class-Specific Probabilities of Reporting each Alcohol Use Behavior</i>					
<i>Drinking Frequency</i>					
Less than Monthly (overall prevalence=28%)	.61	.23	1.00	.00	.00
Monthly (72%)	.39	.77	.00	1.00	1.00
<i>Average Daily Quantity (Moderate Drinking)</i>					
1 drink/day (women); 2 drink/day (men) (45%)	.85	.57	.05	.26	.03
2+ drink/day (women); 3+ drink/day (men) (55%)	.15	.43	.95	.74	.97
<i>HED Frequency (4+/5+ drinks for women/men)</i>					
Not in past year (50%)	.99	.88	.00	.00	.00
Less than monthly HED (22%)	.01	.12	1.00	.64	.01
Monthly HED (28%)	.00	.00	.00	.36	.99
<i>High-Intensity Drinking (8+/10+ drinks for women/men)</i>					
Not in past year (80%)	1.00	1.00	.72	.82	.28
Yes, in past year (20%)	.00	.00	.28	.18	.72
<i>Intoxication</i>					
Not in past year (51%)	.98	.56	.32	.27	.10
Less than monthly (34%)	.02	.37	.68	.64	.34
Monthly (15%)	.00	.06	.00	.09	.56
<i>Class-Specific Demographic Characteristics</i>					
<i>Sex</i>					
Men (overall prevalence=51%)	.48	.41	.42	.52	.67
Women (49%)	.52	.59	.58	.48	.33
<i>Race</i>					
White, non-Hispanic (71%)	.72	.66	.70	.76	.70
Black, non-Hispanic (12%)	.12	.19	.04	.09	.12
Hispanic (17%)	.17	.15	.26	.15	.18
<i>Age</i>					

	Class 1: Occasional, Light Drinkers (28%)	Class 2: Frequent Drinkers (25%)	Class 3: Infrequent Drinkers with Occasional Binging (5%)	Class 4: Frequent Drinkers with Occasional Binging (22%)	Class 5: High-Intensity Drinkers (20%)
18 – 29 years (28%)	.15	.26	.40	.27	.46
30 – 44 years (32%)	.27	.35	.39	.37	.31
45 – 64 years (40%)	.58	.40	.21	.37	.23
<i>Employed Full-time (56%)</i>	.55	.55	.44	.64	.52
<i>Currently Married (49%)</i>	.65	.45	.43	.53	.27
<i>Completed some College (66%)</i>	.68	.69	.50	.76	.54
<i>DSM-5 Psychiatric Disorders</i>					
Past-year major depressive disorder (13%)	.11	.13	.20	.11	.16
Past-year generalized anxiety disorder (6%)	.05	.06	.08	.05	.07